

Studies of Protein Solution Properties using Osmotic Pressure Measurements

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Examination of the protein crystallization process involves investigation of the liquid and solid state and a protein's properties in these states. Liquid state studies such as protein self association in solution by light scattering methods or other methods have been used to examine a protein's properties and therefore its crystallization process and conditions. Likewise can osmotic pressure data be used to examine protein properties and various published osmotic pressure studies were examined by us to correlate osmotic pressure to protein solution properties. The solution behavior of serum albumin, alpha - chymotrypsin, beta - lactoglobulin and ovalbumin was examined over a range of temperatures, pH values and different salt types and concentrations. Using virial expansion and a local composition model the non ideal solution behavior in form of the activity coefficients (thermodynamic) was described for the systems. This protein activity coefficient data was related to a protein's solubility behavior and this process and the results will be presented.